

Hungry Horse Dam Operation
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Annual Reservoir Operation

Hungry Horse stores spring snowmelt and fills toward full pool elevation (elevation 3560 ft msl) during July. Currently, the reservoir pool is drawn down about 20 feet during August to augment river flows intended to help recover salmon in the Columbia River downstream. During fall and winter, the reservoir is drafted for electrical generation and flood control toward minimum pool by mid-April.

Integrated Rule Curves for Hungry Horse Dam operation were developed to balance the requirements of hydropower generation and flood control with fish recovery actions. Rule curves (reservoir elevation targets that adjust based on water supply) culminated from nearly two decades of field and laboratory research to determine the effects of dam operation on aquatic resources upstream and downstream of Hungry Horse Dam. The Northwest Power and Conservation Council (NWCouncil) adopted these operation rules in 1994 and the overall operating plan was included in the Council's Mainstem Amendments in 2004. Montana has been working through two federal lawsuits to implement these Mainstem Amendment operations to balance our needs with the demands of ESA recovery actions in the lower Columbia Basin.

Flood Control

Originally, the reservoir was drawn down deeply to capture the entire spring snowmelt and maintain minimum river flows during the runoff period. Beginning in 2001, a variable flow flood control strategy (called VARQ) was implemented. VARQ reduces reservoir drawdown and improves reservoir refill probability, and restores a more natural river flow pattern, within flood constraints. When the reservoir fails to refill (due to error in water supply forecasts), the margin of error is smaller (reservoir fills closer to full pool than under the earlier rules). These operations were called for by the NOAA-Fisheries' and US Fish and Wildlife Service's Biological Opinions (BiOp) on Columbia River dam operation.

“Sliding” Reservoir Refill Date

The reservoir can safely refill earlier in dry years, but needs to refill later in high water years to avoid uncontrolled spill or flooding. The date targeted for refill is calculated based on monthly inflow water supply forecasts, and adjusted as the reservoir fills.

Summertime Reservoir Drawdown for Salmon Recovery

Since 1995, Hungry Horse Reservoir has been drafted as much as 20 feet during summer to augment river flows in the Columbia River to help young salmon swim to the ocean.

The NW Council's Mainstem Amendments limit the summer draft to 10 feet from full pool when water supply is good (top 80th percentile) and allows the 20-foot draft only during drought years (lowest 20th percentile water years).

Flathead River Operations

Minimum Stream Flow

The minimum flow in the Flathead River at Columbia Falls is 3,500 cfs. Hungry Horse releases water to maintain the minimum flow in the mainstem Flathead River at Columbia Falls when the combined flow of the North and Middle Forks of the Flathead River is less than 3,500 cfs. The minimum flow in the South Fork Flathead River is 900 cfs during abundant water years (top 60th percentile) and adjusts from 900 cfs to 400 cfs as water supply declines (lowest 40th percentile).

Bull Trout Flow

The US Fish and Wildlife Service's (USFWS) BiOp calls for stable summer flows in the Flathead River mainstem. Based on river morphology (wetted perimeter), stable flow in the range of 4-5,000 cfs in the Flathead River mainstem is optimal during summer.

Flow Ramping Rates

The speed at which river flows can change is limited by flow ramping rates published in the USFWS BiOp. Ramping rates were developed based on the shape of the river channel and differ within three ranges of river flow, low, medium and high. Flows are allowed to increase faster than they can decline, to reduce stranding of fish and insects. Flows can change more rapidly when the river is high, and less rapidly when the river approaches minimum flow.

Northwest Power and Conservation Council's Mainstem Amendments

The operation of Hungry Horse Reservoir is intricately tied to the operation of the federal Columbia River Power System and downstream FERC projects like Kerr Dam on Flathead Lake. The reservoir rule curves and river flow limits described above were adopted into the Council's Mainstem Amendments and supported by the federal action agencies. The US Army Corps of Engineers and US Bureau of Reclamation adopted VARQ flood control, sliding refill date and downstream flow limits. The USFWS and NOAA-Fisheries included these specific dam operations in their respective Biological Opinions as reasonable and prudent alternatives as per the Endangered Species Act.